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REMARKS/ARGUMENTS

5 This response is timely filed as it is filed within the three (3) month shortened statutory period for response to the outstanding Office Action. Further, as this response is hereby filed within two (2) months of the mailing date of the outstanding Office Action, it is understood that the shortened statutory period will expire on the date the advisory action is mailed should such advisory action not be mailed until after the end of the three-month shortened statutory period.

Claims 1-24, 27 and 28 remain in the application, with claims 14 and 27 having been withdrawn from consideration as being drawn to nonelected species and group.

10 **Claim Rejections - 35 U.S.C. §103**

Claims 1-13, 15-24 and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,132,480 to Barnes et al. (hereinafter "Barnes") in view of U.S. Patent 6,136,114 to Johnson et al. (hereinafter "Johnson").

15 In so rejecting these claims, the Action asserts that Barnes discloses an igniter composition used in inflatable devices such as vehicle occupant restraint devices which are in a housing and act to ignite a gas generant composition which inflates the airbag. The Action further asserts that the igniter composition of Barnes comprises 10-25 % boron, 55-80 % of an oxidizer such as KNO_3 , and 10-25 % of an

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organic gas producing fuel such as guanidine nitrate. The Action still further asserts that Johnson teaches a micro gas generator that contains an igniter composition and that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the igniter composition of Barnes in a micro-gas generator because Barnes suggests that it can be used to ignite a gas generant and also because Johnson teaches the use of igniter compositions with a micro-gas generator.

Such rejections are respectfully traversed.

It is initially noted that Barnes and the subject application share the common inventor Dr. Michael W. Barnes.

It is further noted that each of claims 9 and 10 requires that the igniter composition contains "less than about 10 composition weight percent boron" and each of claims 16 and 24 requires that the reactant material fuel component contains "less than about 10 composition weight percent boron." (Emphasis added.)

In contrast, as stated in the Action, the igniter composition of Barnes comprises 10-25 % boron. The Action has failed to identify or provide any proper basis for an igniter composition in accordance with Barnes and which igniter composition contains less than about 10 composition weight percent boron, as required by each of claims 9, 10, 16 and 24.

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In view thereof, at least claims 9, 10, 16 and 24 are believed to be clearly patentable over the prior art of record and notification to that effect is solicited.

5 Regarding the amount of boron, the Action cites the recitation in Barnes (at column 3, line 28) of "about 10 %" as support for the contention "that some range below 10 % is acceptable." (See page 3 of the Action.) The undersigned strongly disagrees with this contention.

10 First, the statement in Barnes, appearing at column 3, line 28, has, in the Action been incorrectly or improperly used in an effort such as to bolster the contention that Barnes supports the use of less than about 10 composition weight percent boron, as claimed. In particular, Barnes, at column 3, line 28, states that an igniter composition thereof contains "about 10 to about 25 composition weight percent of boron fuel." It is respectfully submitted that the recitation of the inclusion of "about 10 to about 25 composition weight percent of boron" in Barnes, in no way renders obvious the inclusion of "less than about 10 composition weight percent boron", as required in each of claims 9, 10, 16 and 24.

15 Furthermore, no matter what is meant by the term "about 10" in the statement "about 10 to about 25 composition weight percent of boron fuel" in Barnes, claims 9, 10, 16 and 24 of the subject application require "less than about 10

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5 **composition weight percent of boron.”** (Emphasis added.) Clearly, the currently claimed invention is distinct from that of Barnes. Moreover, while the Action sets forth the proposition that it is “well-settled that optimizing a result effective variable is well within the expected ability of a person of ordinary skill in the subject art,” claims 9, 10, 16 and 24 each requires the inclusion of boron in an amount in a range **less than that disclosed in Barnes.** The claimed inclusion of boron in an amount that is outside the range disclosed in Barnes is not obvious in view of Barnes. Moreover, as such amount is in a range outside of that disclosed in Barnes, such inclusion constitutes more than a mere optimization.

10 Thus, as Barnes requires “about 10 to about 25 composition weight percent of boron fuel” and as the Action has failed to identify any proper basis or support for employing “**less than** about 10 composition weight percent of boron”, as claimed, the so claimed invention is believed to be clearly patentable thereover.

15 Independent claims 1 and 11 each requires that the fuel component and the oxidizer component are each present in the respective igniter composition and reactant material in stoichiometrically balanced amounts. While the Action alleges that stoichiometric balance would be an inherent property of the Barnes composition, the Action has failed to identify any proper support for such proposition.

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The application specification specifically provides that:

References to "stoichiometrically balanced amounts" of fuel and oxidizer components in a composition are to be generally understood to refer to those compositions which include or contain components in sufficient relative amounts such as to minimize or avoid the production of significant amounts of incomplete products of combustion such as CO and NO, for example. More particularly, as used herein, a fuel component and the oxidizer component are considered present in stoichiometrically balanced amounts if the composition contains no more than about ± 4 weight percent of the amount of fuel (other than boron) and oxidizer required for complete burning to CO_2 , H_2O and N_2 . (See page 11, line 14 through page 12, line 2, for example.)

It is respectfully submitted that neither an igniter composition nor a reactant material each having the fuel component and the oxidizer component present in stoichiometrically balanced amounts is an inherent property of the Barnes composition.

As detailed in the application specification, there is a need and a demand for improvements in igniter compositions and related methods of gas generation such as desired or suitable for use in occupant restraint system devices such as micro-gas generators such as in the form of a seat belt pretensioner. In particular, a desirable feature of micro-gas generator devices used in or in connection with seat belt pretensioners is the minimization or avoidance of the production of substantial amounts of possibly undesirable effluent gases such as carbon monoxide and nitric oxide, for example, and which undesirable effluent gases might somehow

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escape into the vehicle interior and thus come into contact with the occupant(s). In this regard, there has been a particular need and demand for such igniter compositions, related methods of gas generation and corresponding occupant restraint system devices which are preferably effective in minimizing or reducing ignition delays, e.g., ignite a gas generant composition within an occupant restraint system device within about 1 millisecond, preferably within about 0.25 milliseconds or less and, even more preferably, at least in certain applications, within a delay time on the order of about 0.1 milliseconds, while also minimizing or avoiding the production of various undesirable effluent gases such as nitrous oxide (N_2O), nitric oxide (NO), ammonia (NH_3) and carbon monoxide (CO), for example. (See application, page 8, line 5 through page 9, line 6, for example.)

The significance of the igniter fuel component and the igniter oxidizer component being present in stoichiometrically balanced amounts, as in the claimed invention, is detailed in the application. (See application, page 19, lines 1-6, for example.)

It is respectfully submitted that:

1. an igniter composition comprising a fuel component containing at least about 3 composition weight percent and less than 15 composition weight percent of boron, and an oxidizer component containing at least one oxidizer material

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selected from the group consisting of alkali metal nitrates, alkaline earth metal nitrates and mixtures thereof, wherein the fuel component and the oxidizer component are present in stoichiometrically balanced amounts, as claimed in independent claim 1, or

- 5 2. an occupant restraint system device comprising a housing containing a supply of reactant material, the reactant material including a fuel component containing at least about 3 composition weight percent and less than 15 composition weight percent of boron, and an oxidizer component containing at least one oxidizer material selected from the group consisting of alkali metal
- 10 nitrates, alkaline earth metal nitrates and mixtures thereof, wherein the fuel component and the oxidizer component are present in stoichiometrically balanced amounts, as claimed in independent claim 11,

are not shown or suggested by the prior art. In particular, the provision of an igniter composition, as claimed, and wherein the fuel component and the oxidizer component

15 are present in stoichiometrically balanced amounts are not shown or suggested by the prior art and are only obtained through the application of the teachings of the subject patent application.

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5 The Action alleges that "[t]he composition of Barnes et al must have the same stoichiometric balance as the instant invention because the amounts and ingredients are the exact same as the instant invention." (Emphasis added.) The Action, however, fails to identify or provide a citation to where in Barnes there is disclosed a composition having these allegedly "exact same" amounts and ingredients. Absent the identification or provision of such a citation, the allegation appears to be clearly based on unpermitted hindsight reasoning.

10 As Barnes does not require that the compositions thereof include fuel and oxidizer in "stoichiometrically balanced amounts", the compositions of Barnes allow carbon monoxide, as well as other products of incomplete combustion, to be major components in the product gases. Those skilled in the art will appreciate that Barnes, for example, allows for or permits such products of incomplete combustion as the compositions thereof are disclosed as being used to ignite a gas generant and the equivalency ratio of the gas generant can be adjusted to allow extra oxygen
15 components such as to further oxidize incomplete products of combustion such as carbon monoxide.

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5 In contrast, in the claimed invention, fuel and oxidizer components are required to be in "stoichiometrically balanced amounts", as defined in the specification. In the claimed invention, the requirement of such stoichiometric balance is independent of either the ultimate use or application of the claimed material as well as independent of the presence or absence of an additional gas generant material.

10 It is noted, however, that claim 13 is directed to an occupant restraint system device that is required to include or contain the claimed reactant material in a supply such as to constitute "at least about 20% on a weight basis of the supply of reactant material and the supply of gas generant material combined." The application, at page 7, lines 9-16, discloses that in micro-gas generators, the igniter material may generally be present within the device in a relative amount of at least about 20% by weight of the total gas producing material present therewithin and typically in a range of about 20-50% by weight of the total gas producing material present in the device.

15 This is in contrast to inflators used in association for inflation of frontal impact airbag cushions employed for driver protection that typically contain or include igniter material in a range of about 3-10% by weight of the total gas producing material (e.g., igniter material and gas generating output charge) present in the inflator device.

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5 In this regards, Barnes in Example 3 discloses using 9 grams of the igniter composition thereof in conjunction with 100 grams of gas generant. Thus, in Example 3 of Barnes, the igniter composition constitutes only about 8.3 % on a weight basis of the supply of reactant material and the supply of gas generant material combined. Clearly, Barnes fails to show or suggest the use of the claimed reactant material in the claimed relative amount to a supply of gas generant.

10 Furthermore, while Johnson has been cited as teaching a micro gas generator that contains an igniter composition, nowhere does Johnson show or suggest the inclusion and use of a reactant material, as claimed, in a relative amount of at least about 20% by weight of the total gas producing material present within the gas generator device. In fact, based on FIG. 1 of Johnson, the initiating charge 16 appears to be included in the Johnson seat belt pretensioner actuation device 10 in a relative amount significantly less than the "at least about 20 %" required by claim 13. In view of the above, claim 13 is believed to be clearly patentable over the prior art of record and notification to that effect is solicited.

15 Nowhere does Barnes show or suggest an igniter composition comprising a fuel component containing at least about 3 composition weight percent and less than 15 composition weight percent of boron, and an oxidizer component containing at least one oxidizer material selected from the group consisting of alkali

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metal nitrates, alkaline earth metal nitrates and mixtures thereof, wherein the fuel component and the oxidizer component are present in stoichiometrically balanced amounts, such as required by claim 1. More particularly, compositions that satisfy the claimed twin requirements regarding boron content and stoichiometric balance
5 between the fuel and oxidizer components are not shown or suggested by the prior art.

Moreover, the possibility of some overlap in the range of one or more ingredients of the claimed composition with the composition of Barnes, in no way renders obvious the claim limitation of the fuel component and the oxidizer component being present in stoichiometrically balanced amounts, as required by the
10 pending claims.

In view thereof, claims 1-1, 15-24 and 28 are believed to be patentable over the prior art of record and notification to that effect is requested.

Withdrawn Claims

In view of the above, consideration of previously withdrawn claim 14
15 and newly added claim 27 is requested.

As previously withdrawn claim 14 depends on claim 12 and, as described above, claim 12 is believed to be patentable over the prior art of record, claim 14 is also believed to be patentable over the prior art of record and notification to that effect is solicited.

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By the above, claim 27 (directed to a seat belt pretensioner comprising the occupant restraint system device of claim 16) has been added. As claim 16 is believed to be patentable over the prior art of record, claim 27 is also believed to be patentable over the prior art of record and notification to that effect is solicited.

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Conclusion

It is believed that all pending claims are in condition for allowance and notification to that effect is solicited. However, should the Examiner detect any remaining issue or have any question, the Examiner is kindly requested to contact the undersigned, preferably by telephone, in an effort to expedite examination of the application.

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Respectfully submitted,



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